Suisun Marsh Monitoring Program
Channel Water Salinity Report

Reporting Period: December 2008

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1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per SWRCB Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity, which is referred as "specific conductance" (SC). The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below to ensure salinity standards are met to protect habitat for waterfowl in managed wetlands:

Station Identification	Station Name	General Location	Classification
C-2*	Collinsville	Western Delta	Compliance Station
S-64	National Steel	Eastern Suisun Marsh	Compliance Station
S-49	Beldon's Landing	North-Central Suisun Marsh	Compliance Station
S-42	Volanti	North-Western Suisun Marsh	Compliance Station
S-21	Sunrise	North-Western Suisun Marsh	Compliance Station

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh.

Station Identification	Station Name	General Location	Classification
S-97	Ibis	Western Suisun Marsh	Monitoring Station
S-35	Morrow Island	South-Western Suisun Marsh	Monitoring Station

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

2. Monitoring Results

2.1 Channel Water Salinity Compliance

During the month of December, 2008, **deficiency standard apply and salinity conditions at only two compliance stations (i.e. S21 and S42)** are in compliance with channel water salinity standards of SWRCB (Table 1). Compliance with standards for the month of December was determined for each compliance station by comparing the progressive daily mean of high-tide SC with respective standards. The standard for compliance stations S-21 and S-42 is 15.6 mS/cm during December 2008. Table 1 lists monthly mean high-tide SC at these compliance stations. The progressive daily mean (PDM) is the monthly average of both daily high-tide SC values. The mathematical equation is shown below.

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\text{\# days of the month}}$$

2.2 Delta Outflow

Outflow for December 2008 started off slightly above 6,000 cfs and was on a downward dive before stabilizing around 4,000 cfs until mid-December. Precipitation events during mid-December gave outflow a boost to about 10,000 cfs before a short drop to about 7,000 cfs. Thereafter another rain system in late December gave the final push to outflow with the highest peak of about 14,000 cfs for the month. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for December 2008 is listed below:

Month	Mean NDOI (cubic feet per second)
December	7,296

2.3 Rainfall

Most of the December 2008 rainfall events occurred in mid and late month as shown in Figure 3. The overall amount was low for the month but every little bit counts given the dry conditions. The largest daily total for the month was 0.40 inches and occurred on the 25th of December. The monthly total is shown below:

Month	Total Rainfall (inches)
December	1.84

2.4 Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during December 2008 is summarized below.

Date	Gate status	Flashboards status	Boat Lock status
December 1 – 4	3 Open	In	Open
December 5 – 18	3 Tidally operate	In	Open
December 19 – 31	3 Open	In	Open

The gates were not operated at the start of December 2008, however, due to salinity concern by the end of the first week, gate operation resumed on December 5 and lasted until December 18. Thereafter due to favorable precipitation forecasted and salinity levels was not concerning for the remainder of the month, DWR suspended gate operations and continues to monitor and assess conditions, and will re-operate as need to control salinity.

3. Discussion

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operations of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions during the Reporting Period

During December 2008 PDM salinity levels at Collinsville(C-2), National Steel(S-64), Beldons (S-49), and Volanti(S-42) ranged between 8.0 mS/cm and 18.0 mS/cm as shown in Figure 1. Salinity levels started off with a wide range and by mid-December shrink as a result of gate operation. December salinity levels converged between 10 mS/cm and 15.0 mS/cm by the end of the month. Collinsville salinity levels increased as a result of gate operation due to lower channel salinity water being tidally pumped into Montezuma slough instead of held around the area to mix and lower salinity levels at Collinsville.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for December 2008 were compared with means for those months during the previous nine years (Figure 4).

Mean salinity pattern of all compliance and monitoring stations resembles that of 2007 but at a slightly higher level. Compared to previous nine years, December 2008 salinity levels overall were ranked first in high Specific Conductance. Unlike past years, the higher salinity for December 2008 is probably a result of dry hydrologic conditions.

Table 1

Monthly Mean High Tide Specific Conductance at Suisun Marsh Water Quality Compliance Stations

December 2008

Station	Specific Conductance (mS/cm)*	Deficiency Standard	Deficiency Standard meet?
C-2**	9.9	n/a	n/a
S-64	11.0	n/a	n/a
S-49	12.86	n/a	n/a
S-42***	14.9	15.6	Yes
S-21***	14.7	15.6	Yes

*milliSiemens per centimeter
**The representative data from nearby USBR station is used in lieu of data from station C-2.
***As define in D1641 and RSMPA, monthly standard only apply to compliance stations, S-42 and S-21 during deficiency year.

Figure 1. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2008

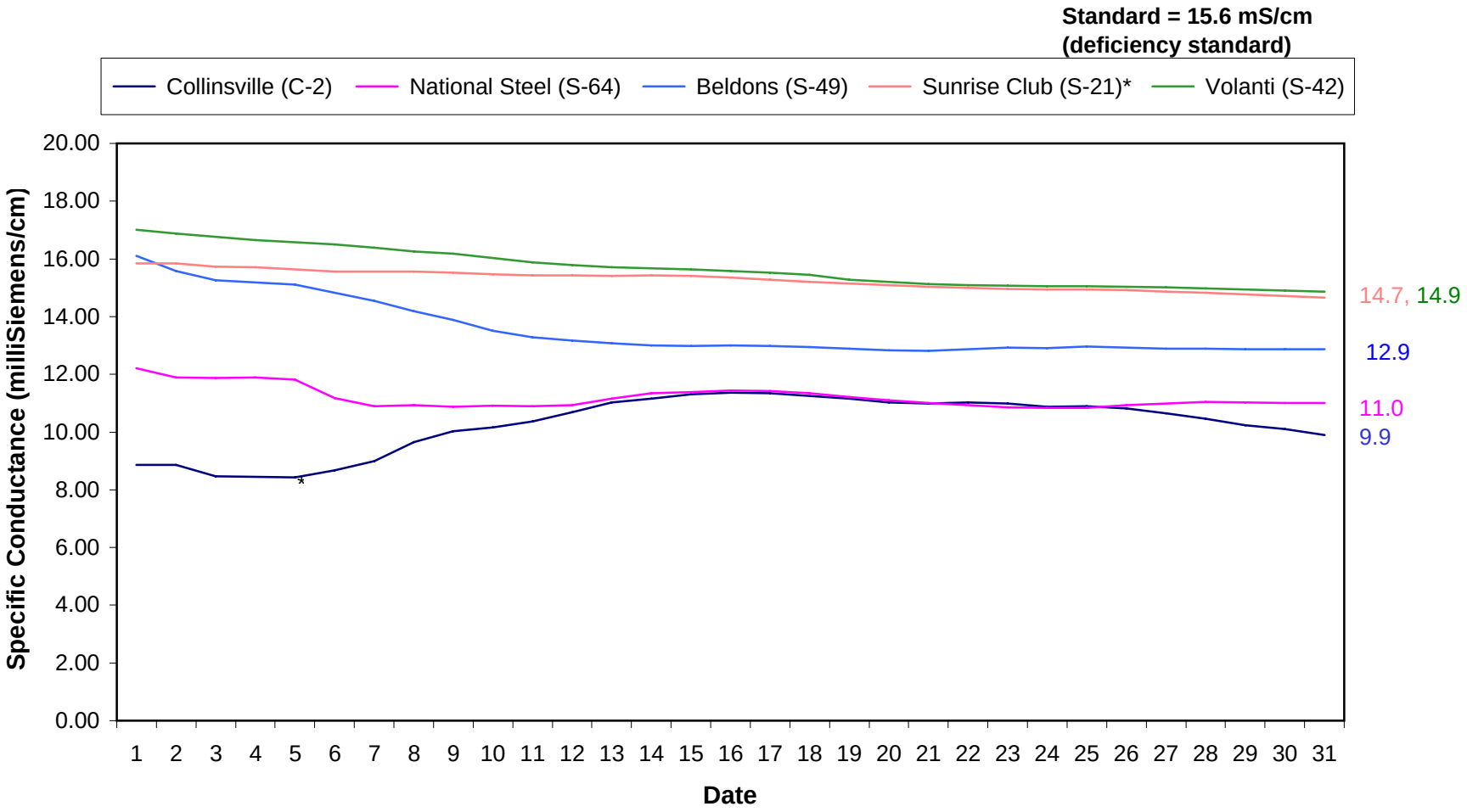
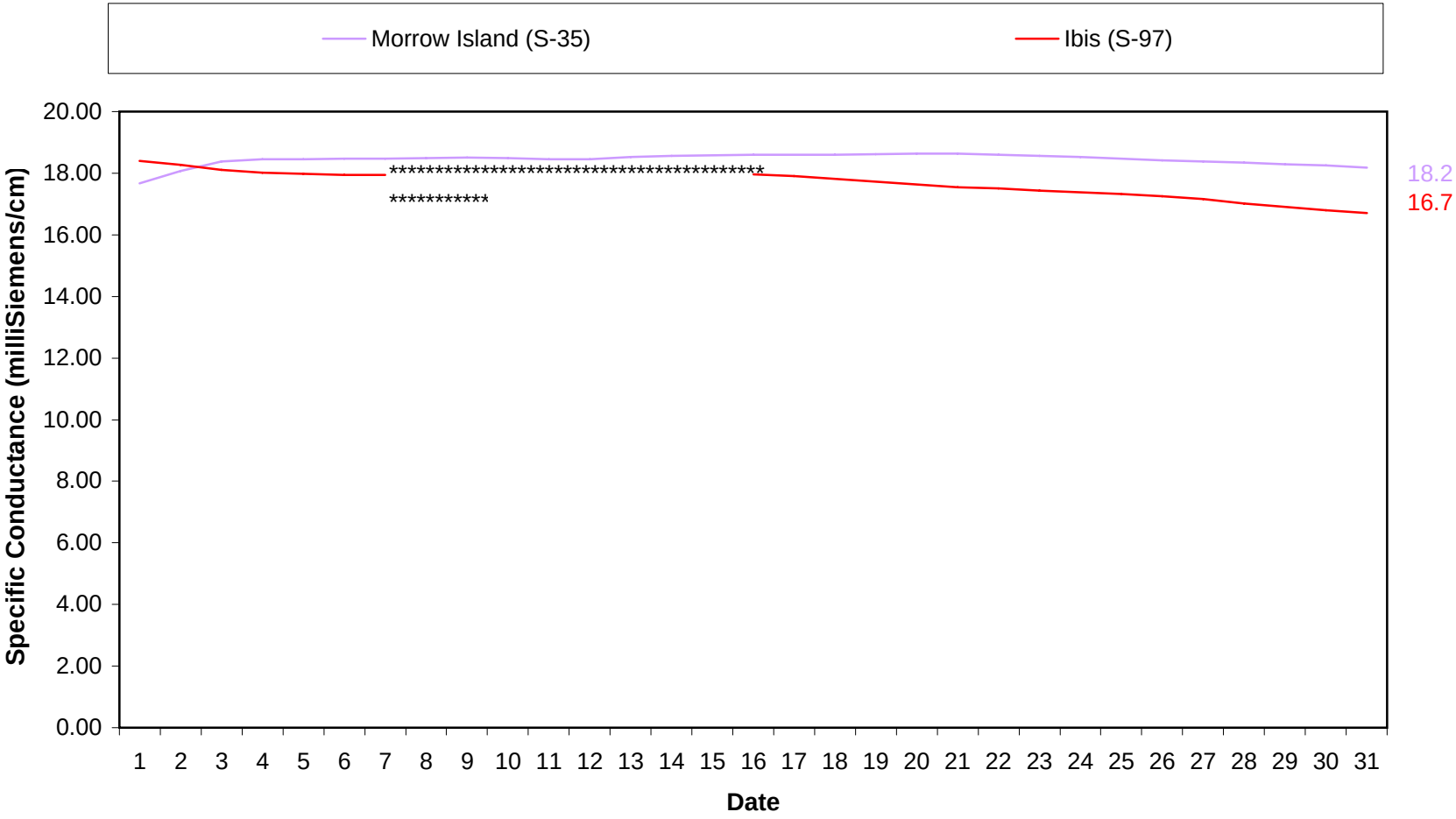
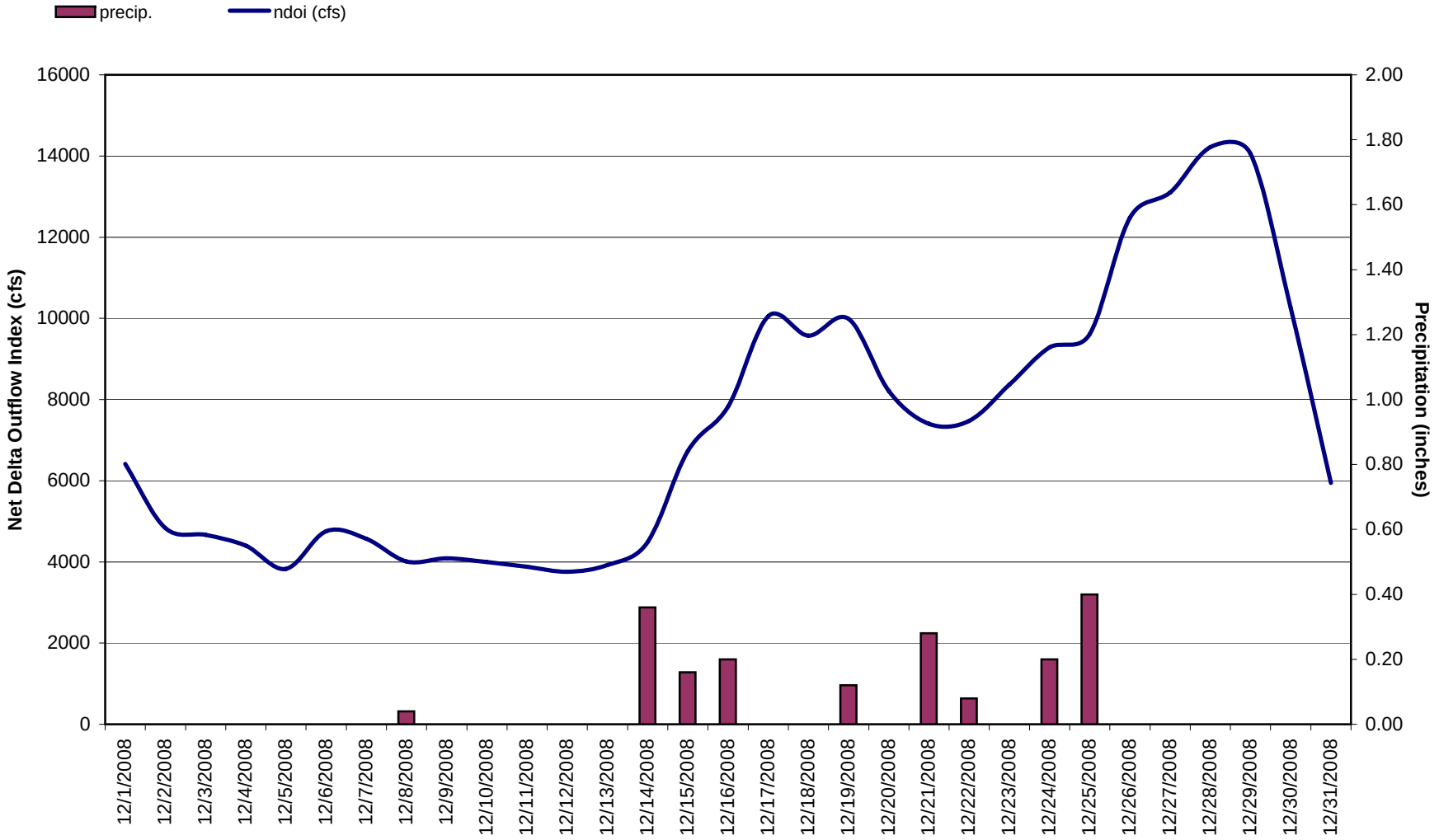


Figure 2. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2008



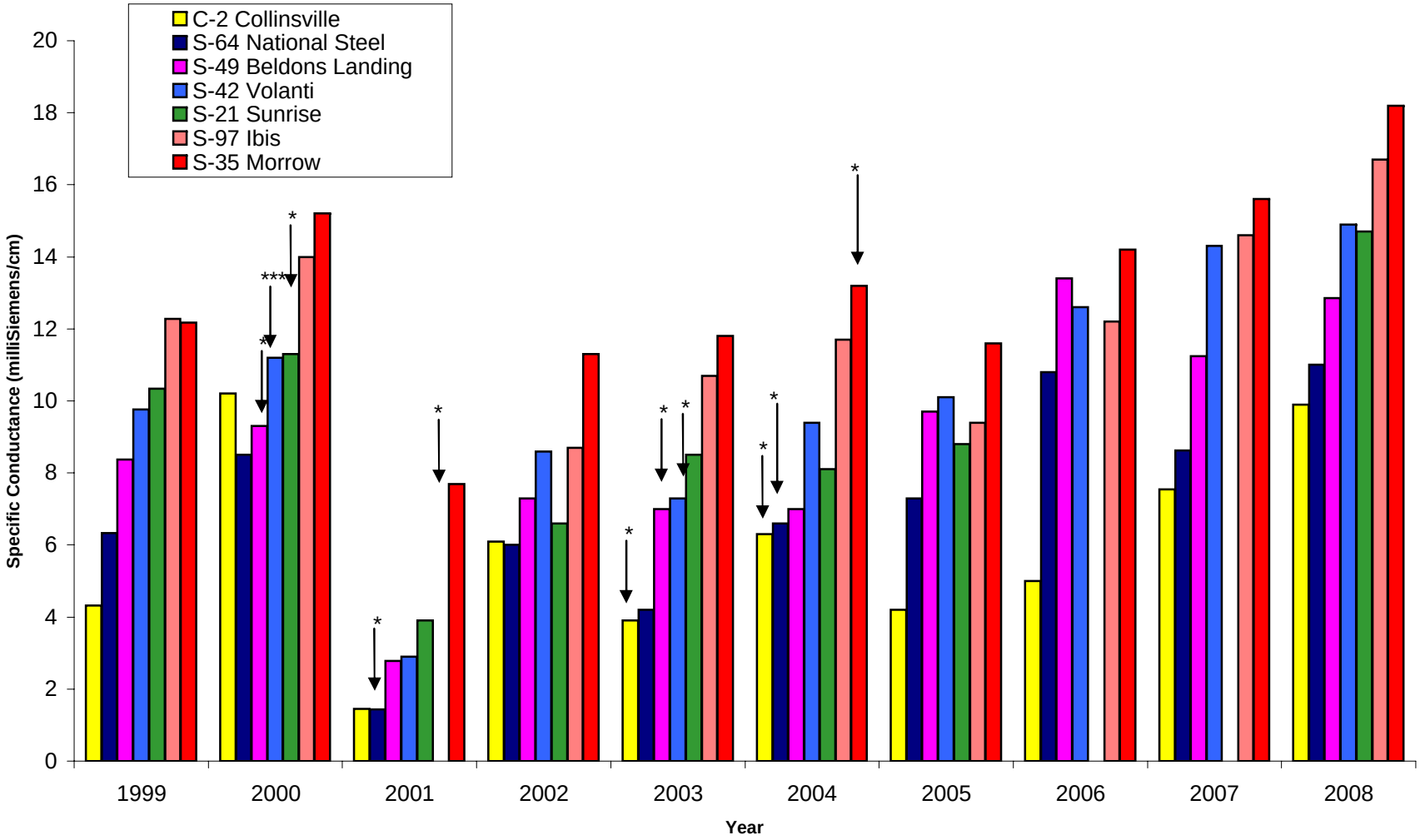
***** S97 data missing due to equipment poblem.

Figure 3. Daily Net Delta Outflow Index and Precipitation*
December 2008



*Preliminary DWR, O&M Net Delta Outflow Index data and precipitation from Stockton Fire Station in the Delta.

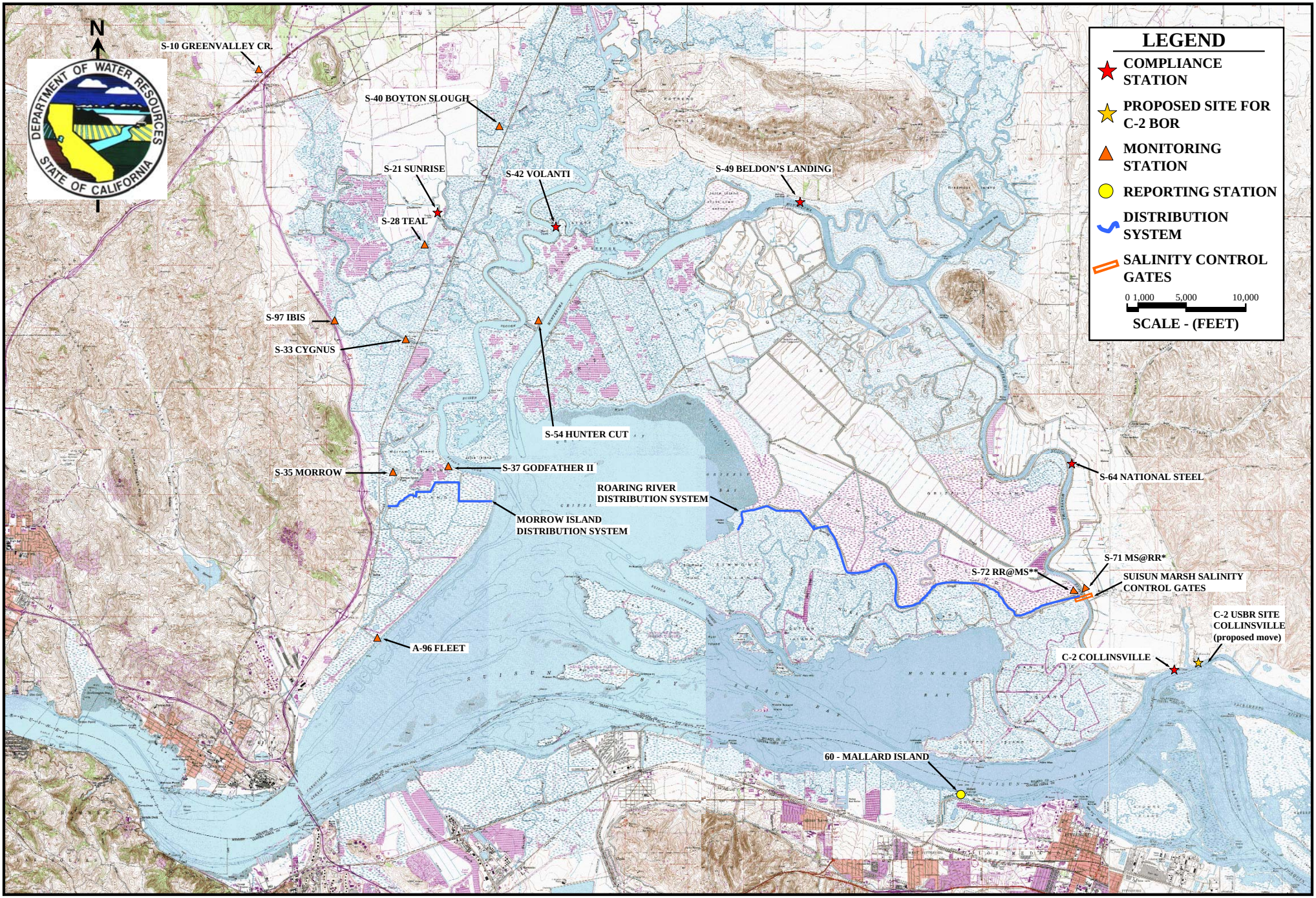
Figure 4. Monthly Mean Specific Conductance at High Tide: Comparison of Monthly Values for Selected Stations December 1999-2008



* Data does not reflect partial month. Data collection was interrupted before the end of the month due to equipment failure.

** Data was not obtained due to power problems at the station.

*** Data was not obtained due to equipment failure.



SUISUN MARSH PROGRAM WATER QUALITY MONITORING AND CONTROL FACILITIES